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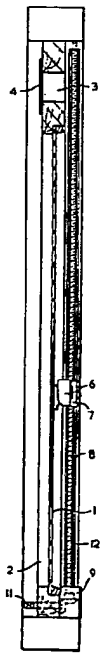
(54) Cleaning system.

(57) The invention relates to a cleaning system for window panes of difficult access, such as those encountered in tall buildings. The cleaning system according to the invention consists of a sprayer and/or sweeper (6) fitted on the outside of the windowpane (1) and capable of performing an up and down movement, and of motor means for driving the movable sprayer and/or sweeper, which motor means can be operated from the space on the inside of the window pane (1), and the spraying medium being supplied to the sprayer (6) from the space on the inside. The cleaning operation can thus be performed entirely from inside the building.



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1016 XA AMSTERDAM.

C L E A N I N G S Y S T E M

The invention relates to a cleaning system for difficultly accessible window panes, such as those encountered in tall buildings. Window panes of tall buildings have so far been cleaned at great cost with the aid of expensive travelling and lifting gear capable of directing a cleaners' cage along all window panes. Such mechanisms are permanently attached to the building, which in itself entails high costs of investment, quite apart from the continuously high cost of personnel relating to the cleaners who man the cage.

The invention aims at providing an improved cleaning system for window panes of difficult access, entailing reduced costs and allowing greater ease of operation.

To this end, a cleaning system according to the invention consists of a sprayer and/or sweeper fitted on the outside of the window pane and capable of performing an up and down movement, and motor means for driving the movable sprayer and/or sweeper, which motor means can be operated from the space on the inside of the window pane, the spraying medium being supplied to the sprayer from the space on the inside. The cleaning operation can thus be performed entirely from inside the building.

According to a certain preferred form of embodiment, the sprayer and/or sweeper is or are mounted by nut means on at least one vertically arranged screwed rod which is driven by the motor means.

According to the invention, the motor means can efficiently be connected to a coupling projecting on the inside of the window pane, the sprayer being in flow communication with a fluid coupling for liquid or air which opens on the inside of the window pane. As a result, it is not necessary to provide a separate motor for each window pane, it being sufficient to provide just one connectable motor for all window panes, for example a two-way portable drill, and the supply of spraying means for all window panes, constituted by liquid and/or air, being adequately ensured by just one mobile unit which is equipped with reservoir and pumping means.

According to further elaboration of the invention, a sprayer and a sweeper are jointly constituted by flexible hoses, fastened to a spraying tube, through which the spraying medium is squirted onto the window pane, which hoses have such a length as to be capable of touching the window pane.

According to the invention, the window pane can furthermore efficiently be provided with a closable opening, extending over the width, through which the sprayer and/or sweepers can be mounted and disassembled. The presence of such an opening, besides allowing mounting and disassembly, provides ease of maintenance and repairs from inside the building.

In order to clarify the invention, a number of examples of embodiment will be described, reference being made to the drawing.

Fig. 1 is an outside view of a window pane provided with a system according to the invention;

Fig. 2 is a sectional view along the line II-II in Fig. 1;

Fig. 3 shows the spraying and sweeping system of Fig. 2 in greater detail and on a larger scale;

Fig. 4 is a sectional view of the suspension of the spraying and sweeping system of Fig. 1 in greater detail and on a larger scale;

Fig. 5 is a horizontal section along the line V-V in Fig. 4;

Fig. 6 shows an example of a compressed-air drying mechanism;

Fig. 7 shows an example of a combined spraying and sweeping mechanism.

Fig. 1 and 2 show a window pane 1 which is set in a window frame 2. On the upper side, extending over the width, is a longitudinal opening 3 allowing communication between the inside and the outside of the window pane, so that mounting, disassembling, maintenance and repair operations at the sprayer or the sweeper can be carried out from inside the building. The opening 3 can be closed with a cover 4, which may include, for example, an air vent (not shown).

The member 6 is a combined wiper and sprayer, which will be explained in further detail with the aid of Fig. 3. This member 6 is suspended on one side with the use of a sleeve-shaped nut 7 from a screwed rod 8, which can be driven through a gearbox 8 by a spindle 11. A loose, two-way portable drill (not shown) can be coupled up with this spindle. The other side of the memeber 6 is freely guided in a channel section 12. For the supply of cleaning liquid and/or air, the member 6 is in flow communication with a connecting nipple 13, to which a reservoir- and pump unit (not shown) can be connected for supplying compressed liquid and/or air. The flow connection consists of the fixed line 14 which starts at the nipple 13 and the upper end of which connects to a flexible hose 16,

which can form a moving loop during up and down movement of the member 6.

Fig. 3 shows the box-type design of the member 6 in transverse section. The box comprises two compartments, in one of which a spring-loaded wiper blade 17 is mounted. The other compartment, connected to the flexible hose 16, is provided with spray holes 18 directed towards the glass 1. Depending on the circumstances, it is evidently possible to supply cleaning liquid, air, or a mixture of the two.

Figs. 4 and 5 again show, on an enlarged scale, the suspension of the member 6 from the screwed rod 8. The sleeve-shaped nut 7, which may be manufactured of a substance such as nylon, possesses a projecting sheet 19 with mounting holes 21, with which the member 6 can be detachably fastened to this projecting sheet. Thus, when the member 6 is brought before the opening 3, this member can be transferred to the inside of the building for a variaty of purposes.

Fig. 6 is a transverse sectional view of a variant of a spraying and drying mechanism 22.

Fig. 7 is a transverse sectional view of a variant of a spraying and sweeping mechanism 23. Flexible tubes 25 which abut against the glass are connected to the pipe 24. When cleaning liquid and/or air are or is being squeezed out, the flexibility of these spray tubes causes them to flutter violently, as a result of which they act as brushes in the case of liquid, and produce a wiper effect in the case of air.

Clearly the invention is not restricted to the examples of embodiment described, but also extends to, for example, a combination of the spraying and sweeping members illustrated ans specified. An embodiment of the type shown in

Fig. 7 likewise falls within the scope of the invention when it is so modified that, instead of flexible tubes 25, flexible strips -- such as leather cords or strings arranged near the sprayer orifices -- similarly perform the fluttering sweeping motion as a result of the emergence of liquid and/or air jets. It is furthermore within the scope of the invention for the motor means to be accommodated in the opening 3. It is furthermore possible, within the realm of the invention,in stead of, or besides, the with the sweeping means up and down movin spraying means, to mount spraying menas fixedly to the edges of the window-pane.

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C L A I M S

1. Cleaning system for a window pane, consisting of a sprayer and/or sweeper (6) fitted on the outside of the window pane (1) and capable of performing an up and down movement, and motor means for driving the movable sprayer and/or sweeper (6), which motor means can be operated from the space on the inside of the window pane (1), the spraying medium being supplied to the sprayer (6) from the space on the inside.

2. Cleaning system according to claim 1, characterized in that the sprayer and/or sweeper (6) is or are mounted by nut means (7) on at least one vertically arranged screwed rod (8) which is driven by the motor means.

3. Cleaning system according to claim 1 or 2, characterized in that the motor means can be connected to a coupling (11) projecting on the inside of the window pane.

4. Cleaning system according to any one of the preceding claims, characterized in that the sprayer (6) is in flow communication with a fluid coupling (13) for liquid air which opens on the inside of the window pane.

5. Cleaning system according to any one of the preceding claims, characterized in that the sprayer and the sweeper (6) are jointly constituted by flexible tubes (25) which are attached to a sprayer pipe (24) and through which the spraying medium is squirted onto the window panes, these tubes or hoses having such a length as to be capable of touching the window pane (1).

6. Cleaning system according to any one of the preceding claims, characterized in that the window pane (1) is provided at its top with a closable opening (3), extending over the width, through which the sprayers and/or sweepers (6) can be mounted and disassembled.

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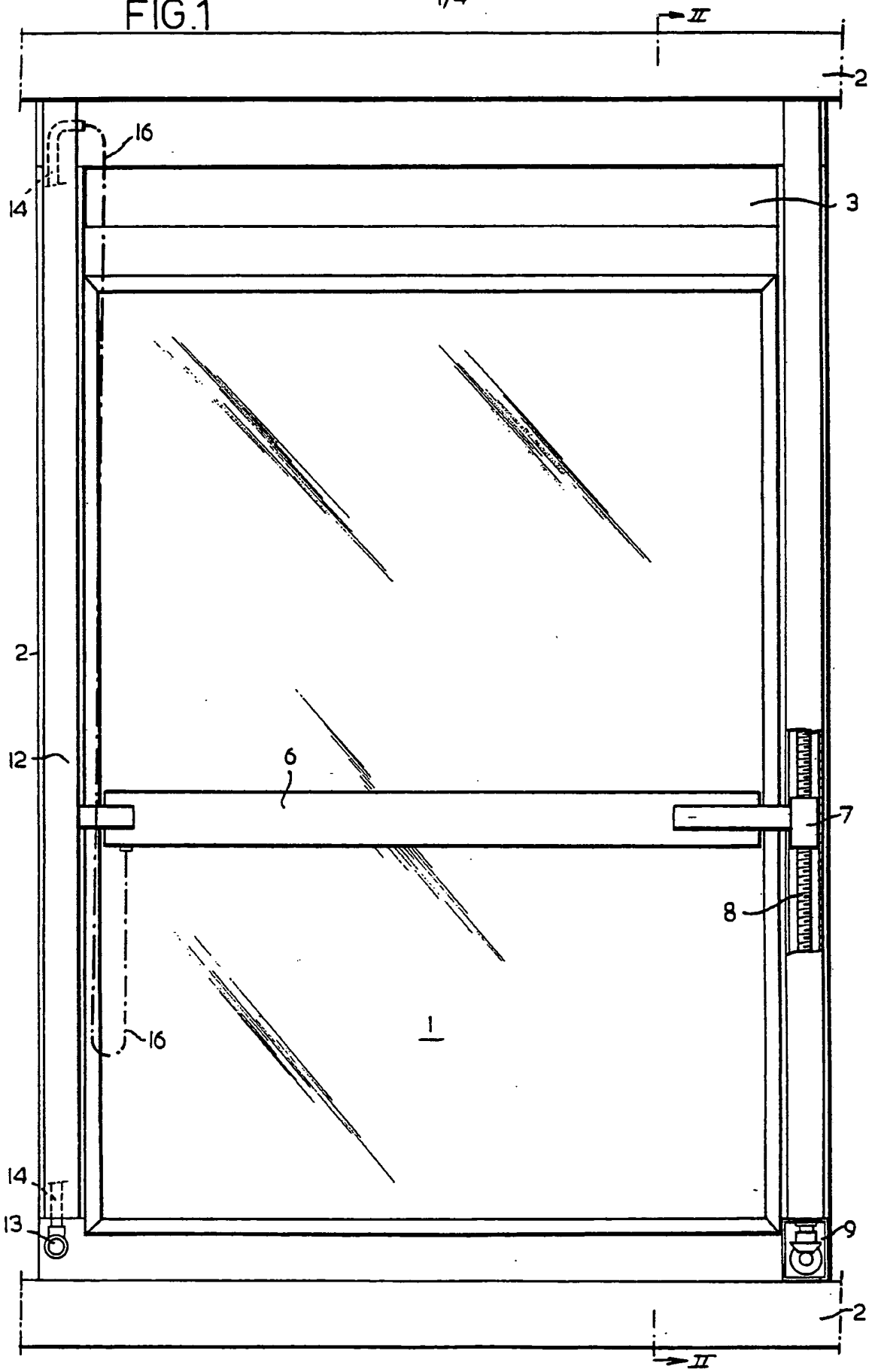
FIG.1



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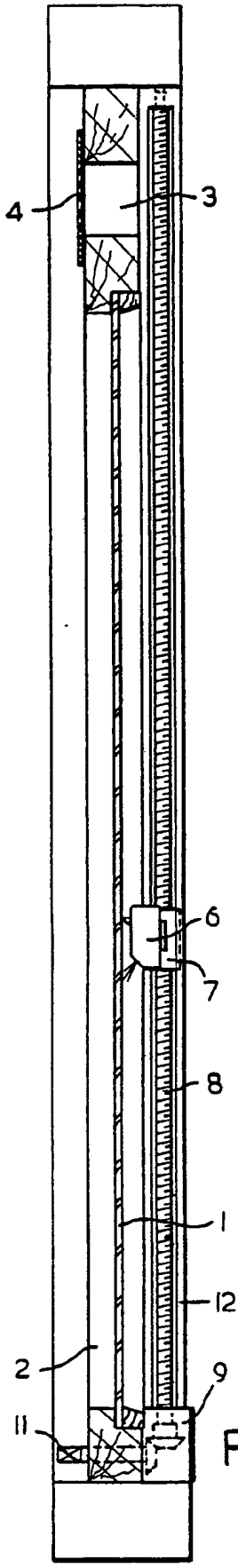

FIG.2

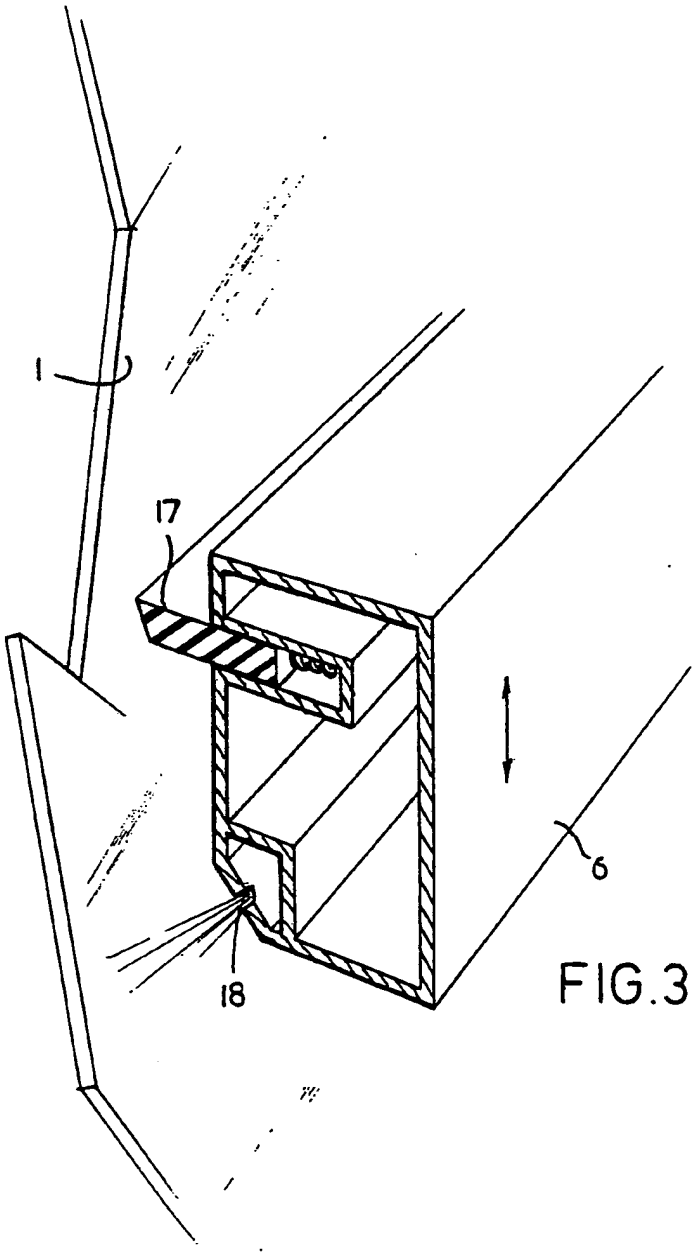

FIG.3

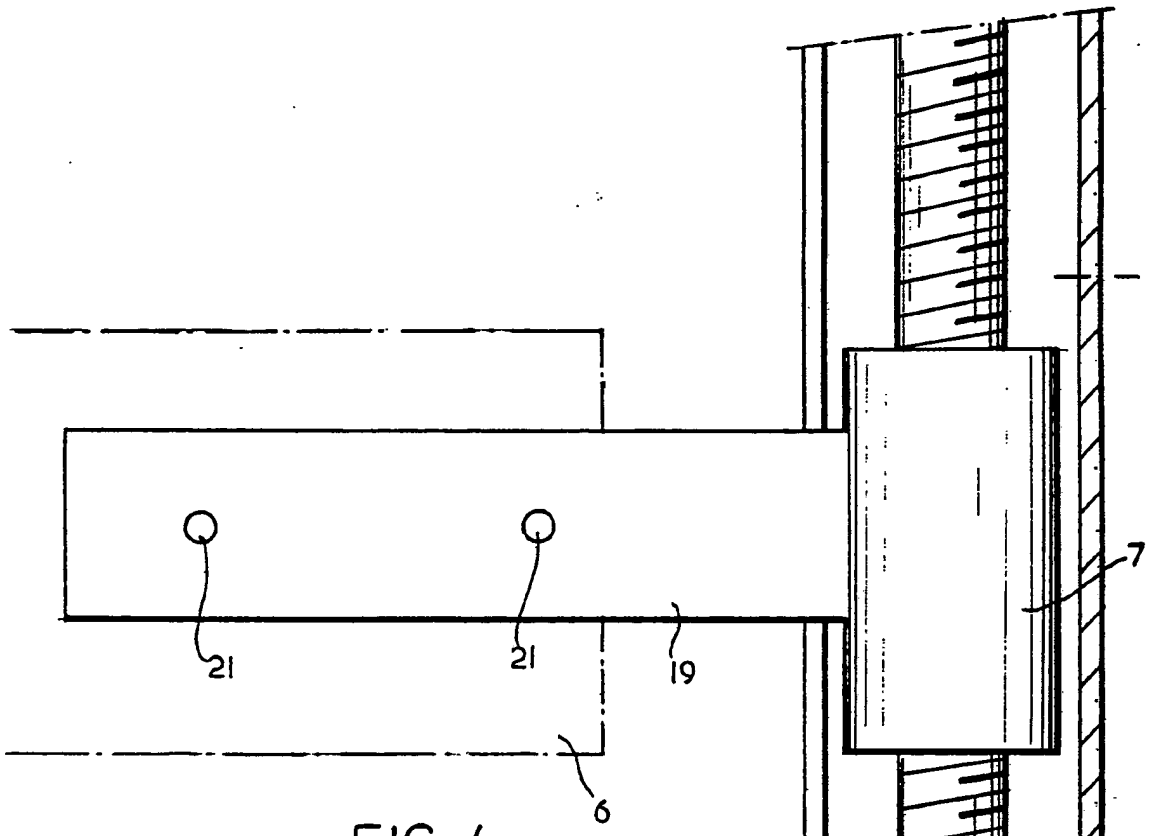

FIG. 4

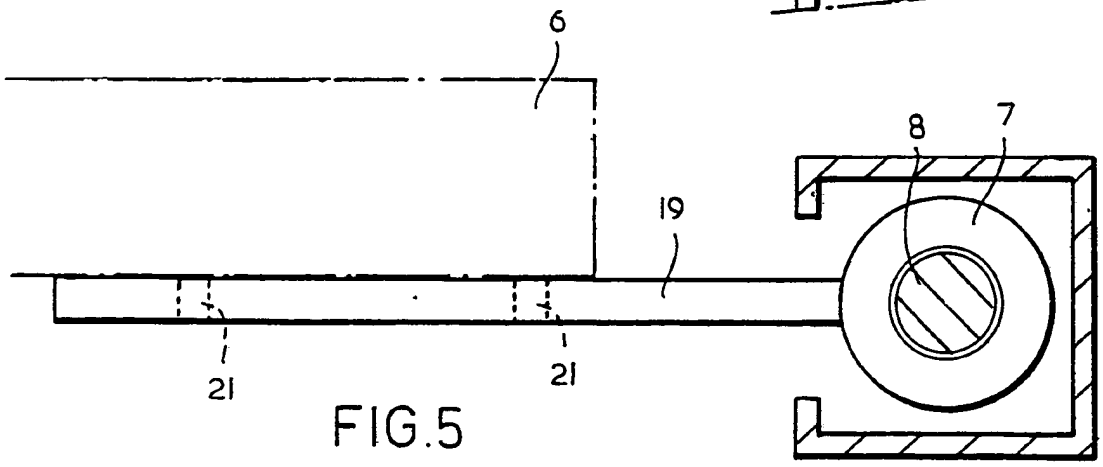

FIG. 5

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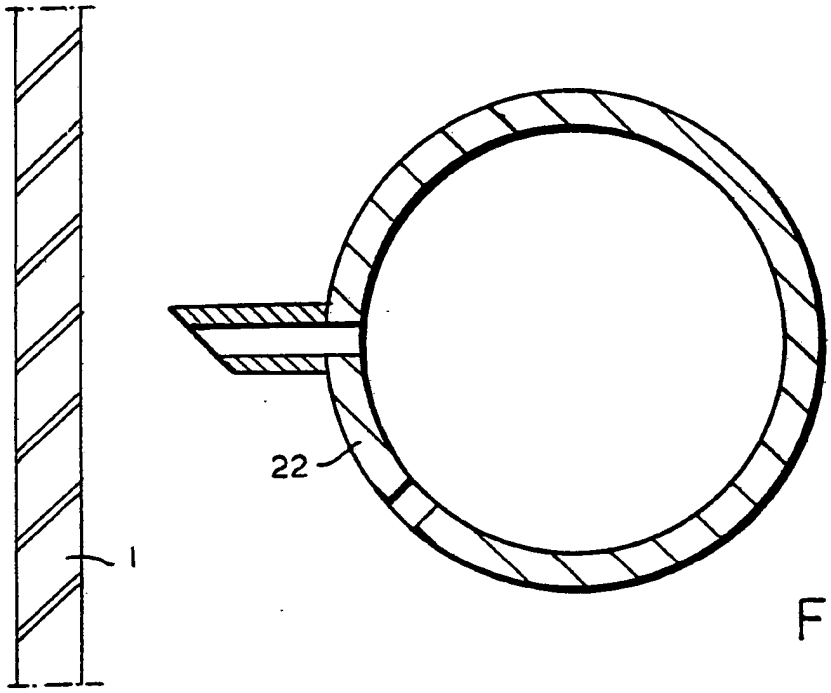

FIG.6

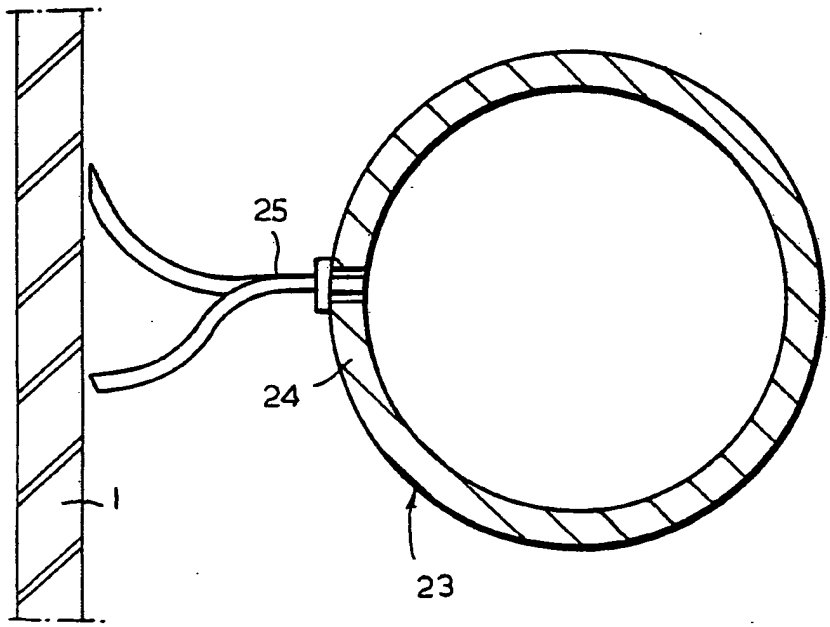

FIG.7

European Patent Office

EUROPEAN SEARCH REPORT

Application number
0047344
EP 80 20 1238

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	NL - A - 72 05385 (TERMATEN,G.J.) * Page II, lines 28-54; page III, lines 1-41; figures 1,2,4 *	1-5
X	US - A - 1 662 887 (HARRIS,H.A.) * Page 1, lines 76-110; page 2, page 3, lines 1-35; figures 1-3, 4,8,9 *	1-5
A	DE - A - 2 748 142 (LAHAYE,H.J.)	
A	DE - C - 307 286 (ROEHRL,J.)	

CLASSIFICATION OF THE APPLICATION (Int. Cl.)

A 47 L 1/02

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

A 47 L

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	08-12-1981	MUNZER

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